

### REMARKS

Claims 10-15 are now pending in the application. Claims 1-9 and 16-20 are cancelled without prejudice or disclaimer.

The rejections of claims 1-3 and 20 under 35 USC 102 (b) as being anticipated by US Patent Publication No. US-2003-0139523-A1 to Nakamura et al.; of claims 6-8 under 35 USC 102 (b) as being anticipated by US Patent Publication No. US-2003-0139523-A1 to Nakamura et al.; of claims 4 and 5 under 35 USC 103 (a) as being obvious over US Patent Publication No. US-2003-0139523-A1 to Nakamura et al.; of claim 9 under 35 USC 103 (a) as being obvious over US Patent Publication No. US-2003-0139523-A1 to Nakamura et al. in view of US Patent Publication No. US-2003-0220437-A1 to Hopkins et al. and of Claims 16-19 under 35 USC 103 (a) as being obvious over US Patent Publication No. US-2003-0139523-A1 to Nakamura et al. have been rendered moot by the cancellation of claims 1-9 and 16-20.

Claims 10-13 were rejected under 35 USC 103 (a) as being obvious over US Patent Publication No. US-2003-0139523-A1 to Nakamura et al. (hereinafter also referred to as "Nakamura") in view of US Patent Publication No. US-2003-0220437-A1 to Hopkins et al. (hereinafter also referred to as "Hopkins") and further in view of US Patent 6,403,720 to Chino et al. (hereinafter also referred to as "Chino").

Claims 14 and 15 were rejected under 35 USC 103 (a) as being obvious over US Patent Publication No. US-2003-0139523-A1 to Nakamura et al.

The cited references do not render obvious claims 10-15.

As is clear from the disclosure of the present application and as recited in claims 10-15, important to the present invention is the use, in the tire tread rubber composition, of (i) the specified aromatic vinyl-conjugated diene copolymer rubber (A) having a Tg (i.e., TgA) of -40° to -5°C and the specified conjugated diene-based rubber gel (B), wherein the Tg of (B) (i.e., TgB) satisfy the relationship (1)

$$TgA - 10 < TgB < TgA + 10 \quad (1)$$

and (ii) the sulfur-vulcanizable rubber, the conjugated diene-based rubber gel having a toluene swelling index Q of 16 to 70 and silica, wherein the following formulae (2) and (3) are satisfied:

$$F = (R + S)/(R + T + A) \quad (2)$$

$$0.6 < F \leq 0.9 \quad (3)$$

wherein F: flexible segment fraction, R: compounding amount of rubber, S: compounding amount of silica, T: total amount of filler including silica, A: extraction amount of acetone.

As a result, the wet performance, the abrasion resistance and the low heat buildup property are improved in the case of claims 10-13 and improved braking performance (i.e., high frictional force), without adversely affecting the die swell in the case of claims 14-15.

This is neither disclosed nor taught in the cited references, as discussed below.

Regarding the rejection of claims 10-13, US Patent Publication No. US-2003-0139523-A1 to Nakamura et al. suggests a conjugated diene rubber, a rubber composition containing the same and a process for producing the conjugated diene rubber.

However, as appreciated by the Examiner, Nakamura neither discloses nor teaches (a) the use of the aromatic vinyl-conjugated diene copolymer rubber (A) having a  $TgA$   $-40^{\circ}$  to  $-5^{\circ}$  and (b) the use of the conjugated diene-based rubber gel (B) having a  $TgB$  satisfying the following formula (1):

$$TgA - 10 < TgB < TgA + 10$$

In the tire tread rubber composition according to claims 10 -13.

The conclusion in the Office Action that Hopkins teaches emulsion and solution polymerized SBR having a  $Tg$  above  $-50^{\circ}C$  is in error. Hopkins neither discloses nor teaches the

use of the above-specified conjugated diene-based rubber gel (B) having the specified TgB satisfying the above relationship (1).

It is also stated in the Office Action, that Chino teaches a rubber composition with the glass transition temperature of the diene rubber being at least 10°C less than Tg (corres. to TgB) of the rubber gel (col. 1 lines 59-64). However, this differs from the specified TgB of the present invention.

Namely, Chino mentions in col. 1, lines 59-64 that the glass transition temperature of the diene rubber (i.e., TgA) being at least 10°C. less than the transition temperature of the gelled rubber (i.e., TgB). This means the following:

$$TgA < TgB - 10$$

$$\text{Namely } TgB > TgA + 10$$

This is completely different from (or opposite to)  $TgB < TgA + 10$  according to the present invention.

As evidenced by the results of Tables III-2 and III-3 (see pages 35 and 36 of the present specification), when the above features (i.e.,  $TgA = -40^{\circ}\text{C}$  to  $-5^{\circ}\text{C}$  and  $TgA - 10 < TgB < TgA + 10$ ) are satisfied, the desired wet braking performance and also, in the case of Table III-3, the desired abrasion resistance were obtained (see Examples III-1 to III-10). This is completely absent in the citations.

Consequently, it is clear that the present invention according to claims 10-13 is not rendered obvious by Nakamura, Hopkins and Chino.

Regarding the rejection of claims 14-15, Nakamura does not teach that the following formulae (2) and (3) are satisfied:

$$F = (R + S)/(R + T + A) \quad (2)$$

$$0.6 < F \leq 0.9 \quad (3)$$

wherein F: flexible segment fraction, R: compounding amount of rubber, S: compounding amount of silica, T: total amount of filler including silica, A: extraction amount of acetone.

Persons of ordinary skill in the art would not have been motivated to discover the optimum or workable range for these variables through routine experiment. Along these lines, please see page 19, line 18 to page 21, line 25, especially from page 19, line 18 to page 20, line 10, of the present specification. Namely, it has been found according to the present invention that, when the flexible segment fraction (F) is:

$$0.6 < F \leq 0.9$$

the desired high frictional force can be obtained.

However, where a rubber composition only satisfies

$$0.6 < F \leq 0.9$$

the die swell becomes large and, therefore, the extrudability becomes poor. Then it has been found according to the present invention that, if a predetermined amount of rubber gel having a toluene swelling index  $Q_i$  of 16 to 70 is compounded, the die swell is decreased and, further, the rubber gel is constantly present as a flexible rubber phase in the rubber, whereby the frictional force can be synergistically improved.

This is completely absent in the cited references.

Furthermore, as evidenced by Table IV-2 (see page 39 of the present specification), the desired wet braking performance and the desired die swell can be obtained in Examples IV-1 to IV-4 by the use of the rubber gel having a toluene swelling index  $Q_i$  of 16 – 70.

The cited art lacks the necessary direction or incentive to those of ordinary skill in the art to render the rejections under 35 USC 103 sustainable. The cited art fails to provide the degree

of predictability of success of achieving the properties attainable by the present invention needed to sustain a rejection under 35 USC 103. See *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727; 82 USPQ2d 1385 (2007), *Diversitech Corp. v. Century Steps, Inc.* 7 USPQ2d 1315 (Fed. Cir. 1988), *In re Mercier*, 185 USPQ 774 (CCPA 1975) and *In re Naylor*, 152 USPQ 106 (CCPA 1966).

Moreover, the properties of the subject matter and improvements which are inherent in the claimed subject matter and disclosed in the specification are to be considered when evaluating the question of obviousness under 35 USC 103. See *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727; 82 USPQ2d 1385 (2007), *Gillette Co. v. S.C. Johnson & Son, Inc.*, 16 USPQ2d. 1923 (Fed. Cir. 1990), *In re Antonie*, 195, USPQ 6 (CCPA 1977), *In re Estes*, 164 USPQ 519 (CCPA 1970), and *In re Papesch*, 137 USPQ 43 (CCPA 1963).

No property can be ignored in determining patentability and comparing the claimed invention to the cited art. Along these lines, see *In re Papesch*, supra, *In re Burt et al*, 148 USPQ 548 (CCPA 1966), *In re Ward*, 141 USPQ 227 (CCPA 1964), and *In re Cescon*, 177 USPQ 264 (CCPA 1973).

In view of the above, consideration and allowance are respectfully solicited.

In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

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The Office is authorized to charge any necessary fees to Deposit Account No. 22-0185, under Order No. 21713-00035-US1 from which the undersigned is authorized to draw.

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